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Prosthetic Rehabilitation in Older Adult with Free Gingival Graft: Case Report

CASE REPORT

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Abstract

Aim: The aim of the present study was to perform the clinical evaluation of the thickness of the soft tissue around dental implants using a free gingival graft obtained from the palate.

Background: Rehabilitation in elderly patients improves physiological functions and quality of life, and when this rehabilitation involves a surgical stage, it becomes a challenge, even for more experienced surgeons.

Methods: a 64-year-old, white, female patient with a complaint of difficulty chewing and discomfort stemming from her dental status. Rehabilitation was proposed involving a multidisciplinary approach to reestablish esthetics, function and wellbeing. For such, 4.1 Bone Level Tapered® implants were installed. During the presurgical preparation, a free gingival graft was planned to increase the gingival area using the Miller technique. After establishing the suitability of the oral environment, impressions were made in alginate for the fabrication of an acrylic surgical stent to protect the donor site on the hard palate and minimize the morbidity of the surgical intervention.

Conclusion: In the case reported, the increase in the gingival tissue using a free gingival graft provided satisfactory peri-implant health in an older patient throughout annual follow-up for 15 years.

Keywords
Free Gingival Graft, Implant, Plastic Surgery, Periodontics, Graft, Rehabilitation.

Introduction

Mucogingival surgery regards all surgical periodontal procedures to correct defects in the morphology, position or quantity of gingival tissue around a tooth [1] and soft tissue grafts used in periodontal therapy. Besides the treatment of deformities of the gingival tissue and alveolar mucosa, the term also applies to the change in the size and shape of the edentulous alveolar ridge as well as surgical procedures to improve the esthetics of the soft tissues [2].

Different surgical techniques have been developed for the removal of tissue to serve as a graft with minimal postoperative discomfort and improve the healing of the donor area [3]. The palate is the most frequently used as the donor site, the best region of which is located between the premolars and molars due to its thickness [4, 5]. The graft is denominated a free graft, unlike pedicle grafts, which are positioned flaps [3]. The gingival restoration technique using a graft of tissue transplanted from the patient himself/herself was first cited by Davenport (1904), describing a presentation by Dr. Younger, who reported a case of extensive absorption of the gingiva and alveolar tissue [6].

Problematic areas with an absence of keratinized tissue and gingival recession can be effectively treated with a free gingival graft to create an adequate inserted band of gingiva and cover an exposed root [2].

Gingival recession is the migration of the apical free gingival margin to the cementoenamel junction [7]. Gingival recession is often associated with genetic and anatomic factors involving an insufficient quantity of keratinized gingival tissue, frenal traction, a poorly positioned tooth, dehiscence and bone fenestration, but the most common cause is abrasive, traumatic tooth brushing [8-12]. The recession of the free gingival margin (marginal tissue recession) can cause esthetic problems, hypersensitivity and root caries. Periodontal plastic surgery results in an increase in the api-coronal and buccolingal dimensions of gingival tissues, forming gums with sufficient volume and integrity to ensure an adequate epithelial seal and a biological bond between the grafted tissue and previously exposed root surface at the level of the cementoenamel junction, resulting in a shallow gingival pocket [13].

In 1963, Bjorn [14] was the pioneer in the use of the free gingival graft (FGG), which is a classic root coverage technique. The term FGG was first coined by Nabers in 1966 [15]. Since then, this technique has been used to cover exposed root surfaces as well as increase the width and thickness of fixed gingival tissue. The advantages are the high predictability and relative ease of the technique [16]. FGG is mainly used to increase the width of keratin in the mucosa [17]. In a consensus report published in 2015, the American Academy of Periodontology concluded that in areas with suboptimal plaque control, a minimum of 2 mm of keratinized tissue is necessary for the adequate maintenance of periodontal health and the quantity necessary for the increase in keratinized tissue using an FGG ranging in size from 3.1 to 5.6 mm [18].

The aim of the present study was to perform the clinical evaluation of the thickness of the soft tissue around implants using a free gingival graft obtained from the palate of an older patient.

Case report

A 64-year-old, white, female patient visited the clinic with a complaint of difficulty chewing and discomfort stemming from her dental status. Rehabilitation was proposed involving a multidisciplinary approach to reestablish esthetics, function and wellbeing.

The presurgical preparation involved oral hygiene instructions as well as root scraping and planing to eliminate existing points of infection and ensure an adequate oral environment **(Figure 1a)**. The Miller FGG technique was chosen to increase the gingival volume. Impressions were made in alginate for the creation of an acrylic surgical stent **(Figure 1b)**

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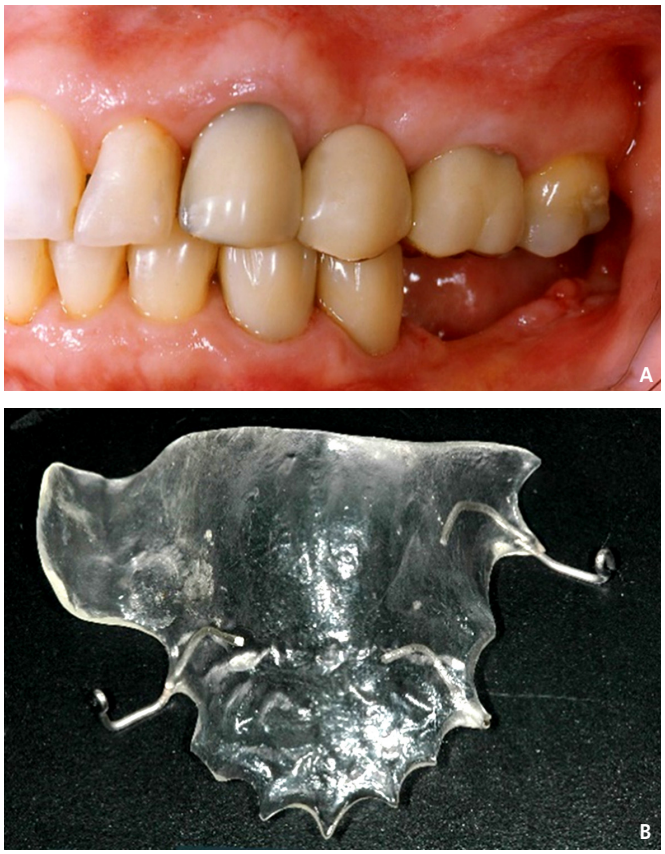
Figure 1.



a) Area corresponding to teeth 36 and 37 to be rehabilitated; b) surgical stent fabricated in acrylic resin to protect donor region on palate

to protect the donor site on the hard palate from which the graft was subsequently collected, thereby minimizing the morbidity of the surgical intervention.

The next step was the placement of the implants in the region of teeth 36 and 37. After the evaluation of the preoperative exams and selection of the implants, the patient was medicated with midazolam (15 mg, single dose), Fexofenadine® (60 mg, single dose) and amoxicillin (500 mg every 8 hours, beginning 24 hours prior to surgery and maintained for seven days). Intraoral antisepsis was performed by rinsing with 0.12% chlorhexidine for one minute prior to surgery. Total thickness flaps were created at both sites to enable access to the bone that would receive the implants. The same surgical protocol was used in both cases: Local anesthesia was performed with 4% articaine and epinephrine (1:100,000, DFL, Rio de Janeiro, RJ, Brazil). An incision was then made at the top of the alveolar crest with a 15C scalpel (Swann-Morton, Sheffield, England) and a detacher was used to pull back the full-thickness flap. Gingival thickness was measured using a PC15® millimeter periodontal probe (Hu-Friedy, Chicago, IL, USA) and specimeter. The protocol determined by the manufacturer was used for the placement of the implants (4.1 Bone Level Tapered®, Institut Straumann, Switzerland). An implant cover measuring 0.5 mm in height was placed over all implants.

FGG surgical step

Thirty days after the implantation surgery **(Figure 2a & b)**, the patient was submitted to a new surgical procedure: reopening and placement of the graft. Local anesthesia was performed with 4% articaine

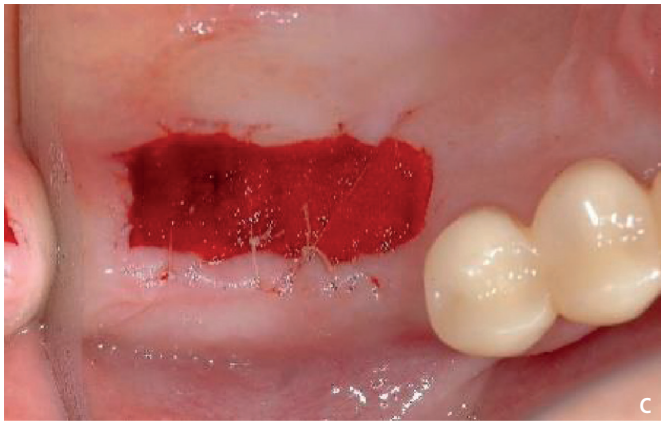
Figure 2.

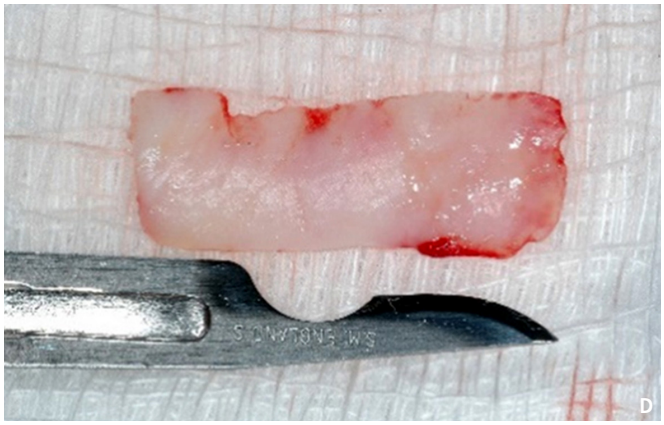
a) & b) Implantation area prior to second rehabilitation step.

and epinephrine 1:100,000 at both the receptor site and donor site (palate between the maxillary first premolar and maxillary first molar).

Reopening was performed with a horizontal incision corresponding to the area of the implants and two chambered vertical incisions extending apically to 3 to 4 mm short of the mucogingival line. Next, the donor site was prepared with an incision in the region of the hard palate corresponding to teeth 16 and 17 **(Figure 2c)** and the collagen graft was removed **(Figure 2d)**.

Figure 2.



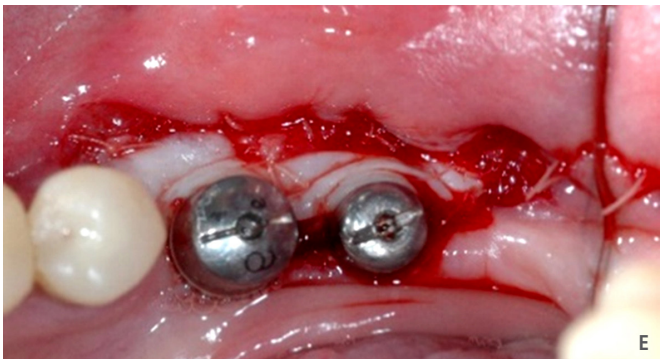


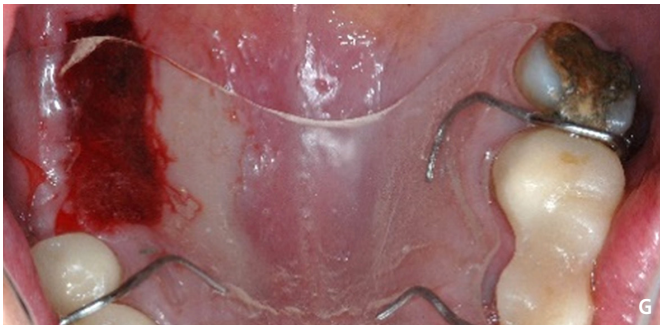
c) donor site on palate corresponding to teeth 16 and 17; d) free gingival graft removed and prepared.

A surgical envelope was created at the receptor site to enable the insertion of the FGG, which was sutured and stabilized with horizontal and simple mattress sutures **(Figure 2e & 2f)**. Synthesis was performed with resorbable Vicryl® 6.0 (Ethicon, Johnson & Johnson, Skillman, NJ, USA). The healing caps were placed for the complete protection of the area **(Figure 2f)** and the surgical stent was installed to protect the palate and ensure greater patient comfort **(Figure 2g)**.

The patient received postoperative instructions not to perform brushing of the operated area, but rather use a 0.12% chlorhexidine mouthrinse for one minute twice a day for the two weeks beginning 24 hours after the procedure. Analgesics and non-steroidal anti-inflammatory agents were prescribed for the control of pain and swelling. The suture was removed two weeks after the surgery

Figure 2.





e) & 2f) free gingival graft positioned in receptor area, placement of healing caps, suturing; g) donor area protected with surgical stent.

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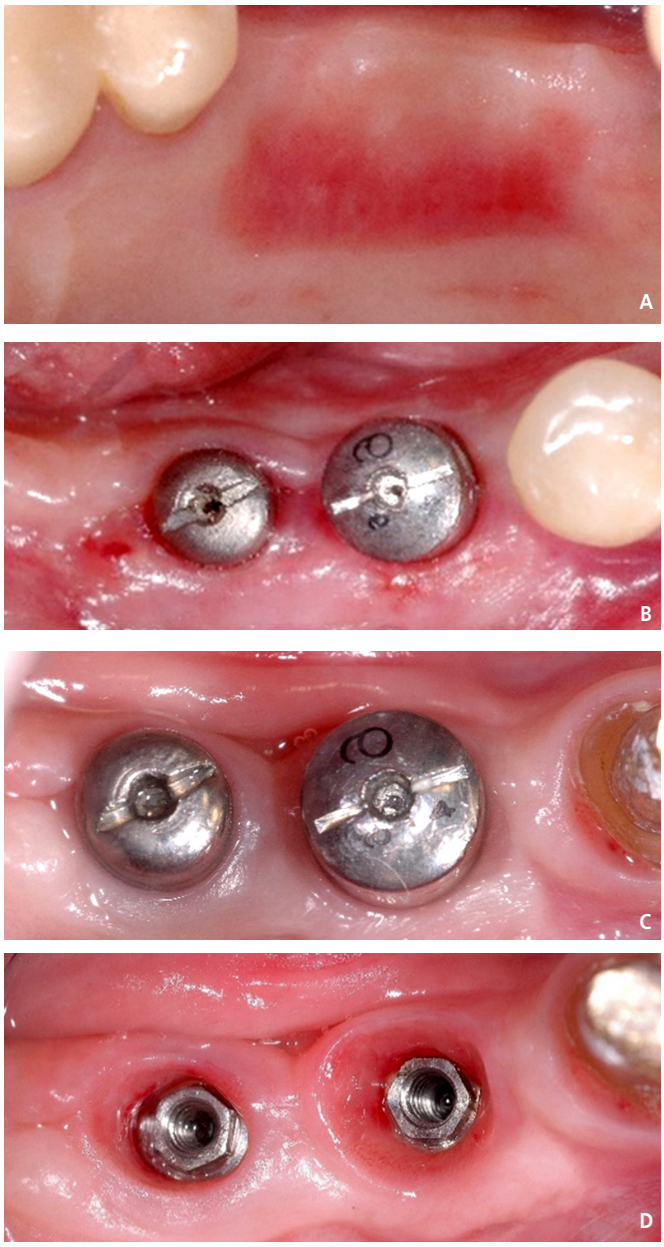
Figure 3.

a), b) & c) Suture removed 15 days after graft; d), e) & f) appearance of donor area (still protected by surgical stent).

(Figures 3a, 3b & **3c)** and the donor site on the palate was evaluated **(Figures 3d, 3e** & **3f)**. The patient was instructed to perform atraumatic dental hygiene of the treated areas using a soft-bristle brush and dental floss.

At 30 days, the patient was evaluated again. Both the donor **(Figure 4a)** and receptor **(Figures 4b** & **4c)** sites were in a good state of healing. Upon removal of the healing caps, the gingival tissue exhi-

Figure 4.



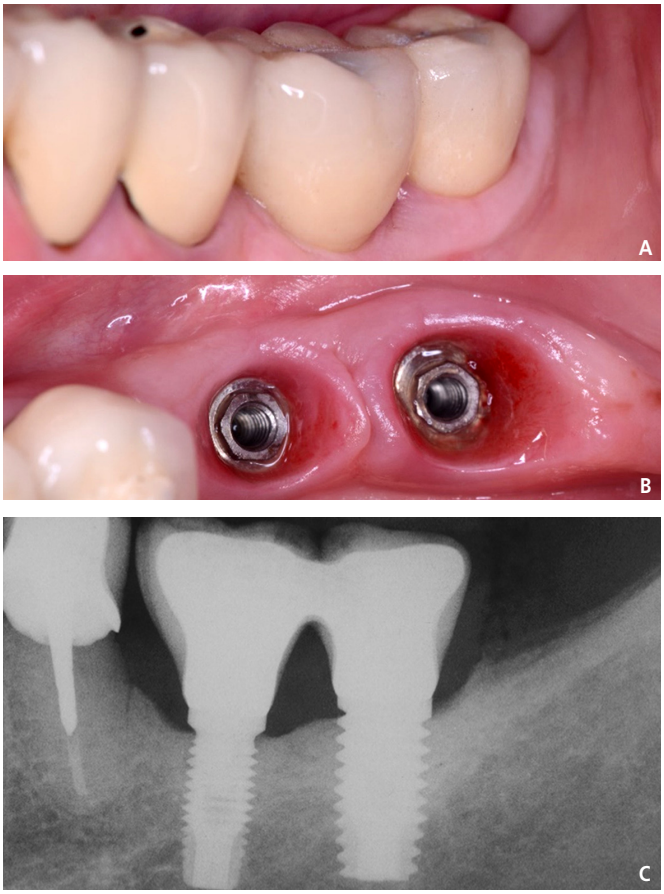
a) Donor site on palate after 30 days; b) & c) receptor site of free gingival graft; d) receptor site of free gingival graft after removal of healing caps

Figure 4.

e) rehabilitated area after receiving definitive prosthesis.

bited an excellent contour and emergency profile **(Figure 4e)**. The area was molded and the healing caps were placed again. After 15 days, the definitive prostheses were placed **(Figure 4f)**. The patient was followed up annually for 15 years **(Figures 5a, 5b** & **5c)**.

Figure 5.



a) Rehabilitated area at 15-year follow-up; b) rehabilitated area at 15-year follow-up after removal of prosthesis showing good gingival health; c) X-ray of rehabilitated area at 15-year follow-up.

Discussion

The role of inserted keratinized gingival tissue as a factor for the prevention of mucositis and peri-implantitis has long been discussed and studies have been conducted to identify the relation between inserted keratinized gingival tissue and the status of the tissues surrounding implants [19]. The peri-implant mucosa provides a biological seal around dental implants and protects the underlying bone from the contaminated oral environment [20, 21]. The absence of adequate keratinized gingival tissue inserted around implants can result in a more intense accumulation of bacterial plaque and gingival inflammation [22].

The maintenance of the health of the peri-implant soft tissue is necessary to the longevity of dental implants [23] and dentures [24]. The healing of soft tissues after implant surgery results in the establishment of a border tissue composed of either keratinized or non-keratinized mucosa [25]. Several surgical procedures have been used to increase keratinized mucosa surrounding implants, such as free gingival grafts, connective tissue grafts, pedicle grafts and apically positioned flaps [26-28].

The FGG technique has been used since 1963 [14] and is a classic root coverage technique, but the term FGG was only coined in 1966 [15]. Since then, these grafts have been used not only to cover exposed roots, but also to increase the width and thickenss of inserted gingical tissue. The major advantages of FGGs are the high predictability and relative ease of the technique [16].

The FGG is considered a successful, predictable technique [29] that can prevent the development of hard and soft tissue problems during rehabilitation with implants [30]. This procedure can be performed prior to the placement of the implant, during the second step of implant surgery or after the placement of the definitive prosthesis [29]. Grafting prior to implant placement or during the second phase of surgery can result in a longer wait time before

rehabilitation treatment [31]. The patients cannot use the prosthesis during the healing period of the graft, which can have an impact on physiological functions, especially in patients suffering pain and discomfort through various surgical stages [31].

A limitation of the technique is that it involves two surgical sites and causes morbidity at both sites. However, adequate medication and follow-up during the first two weeks of the post-operative period can minimize the occurrence of such morbidity [24]. The anatomic properties of the palatal donor region also affect the revascularization and stability of the dimension of the graft. The anterior region is a better donor site for the survival of the graft during the early healing process compared to the posterior region [32].

In a study on the importance of gingival tissue to periodontal health, Lang and Loe (1972) concluded that "two millimeters of keratinized mucosa is adequate for the maintenance of gingival health". This expression has been widely cited as the definition of what constitutes adequate gingival width for the maintenance of periodontal health [33]. Subsequent studies were conducted to determine the ideal width of keratinized mucosa around natural teeth and evaluate the protection capacity of the mucosa in relation to its width, concluding that inflammation still occurs in cases of deficient oral hygiene independently of whether the keratinized mucosa is greater or less than 2 mm [34, 35].

FGG has also be proposed as a prophylactic measure prior to implant placement when the baseline width of the keratinized mucosa is less than 2 mm [36]. The graft is believed to arrest additional gingival recession and provide a hygienic environment with enhanced esthetics [37, 38]. In a clinical trial, Oh et al. (2017) [39] suggest that the increase in keratinized gingiva using an FGG is a practical solution for the treatment of peri-implant mucositis and peri-implantitis in cases with a lack of keratinized tissue, especially in the early stages of these conditions.

In the case reported herein, the increase in gingival volume with the FGG led to satisfactory peri-implant health in an older patient in annual follow-up for 15 years.

Conclusion

The use of FGG to increase the volume of keratinized gingival in dental implant surgery for older patients is a practical, safe solution for the maintenance of periodontal health around the implant.

The authors declare

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The authors declare that they have no conflict of interest.

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